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(54) **Wallpapers**

(57) It is known to construct water impermeable surfaced wallpapers such that they will delaminate enabling the water impermeable layer to be removed and allowing the other layer(s) to be removed using conventional water stripping techniques. However, if a textured wallpaper, for example woodchip paper, is to be removed problems are often encountered as the paper is conventionally painted after being applied to the wall. This paint forms a moisture-proof barrier. Described herein is a multiply wallpaper which includes a parting agent which allows the paper to be dry split between two plies on either side of the parting agent.

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WALLPAPERS

This invention relates to wallpapers.

5 A conventional way of decorating walls is to adhere wallpaper to them. When it is desired to re-decorate walls, it is necessary to remove the wallpaper. Conventionally this is done by softening the bond using water, or if the paper is more difficult to strip, steam, enabling the previously applied paper to be peeled away.

10 Such an approach can be carried out only with ease when the wallpaper in question is relatively water or water vapour permeable. It does not work well with impermeable surfaced papers, such as vinyl papers, but in those cases
15 it is possible so to construct the wallpaper so that it will delaminate into one or more plies which remain on the wall and one or more which can be pulled off essentially as a sheet. The ply or plies remaining on the wall may then be removed easily using water stripping, or may
20 indeed be left on the wall to act as a "lining paper".

One way of ensuring that wallpapers will split in this way is disclosed in British Patent Specification 1023468. This discloses the use of a multiply paper in which one of
25 the plies has a lower plucking strength than the rest, so providing a layer at which the paper will peel or split

apart. That approach can be successfully used for plain
wallpapers, but it does not work if applied to certain
textured ones where the texturing comes from the inclusion
into the paper structure of a texturing material such as
5 woodchips.

Textured wallpapers generally comprise at least two plies,
a base ply including particulate texturing material, e.g.
woodchips and a plain outer ply. In manufacture, the two
10 plies are formed separately, brought together as wet webs
and then dried. In use, it is the base ply which is
adhered to the wall and the outer ply will then normally
be painted.

15 Woodchip (or ingrain) wallpaper is conventionally
manufactured on twin-wire machines with the outer ply
being formed on the upper wire and the base ply on the
lower wire before being brought together and dried. The
outer ply will generally be formed just from fibre pulp.
20 The base ply may be made from a single layer of woodchip
and fibre pulp or of a first layer (which forms the base
of the final wallpaper) from just fibre pulp which is
provided with a second overlayer of fibre and woodchip to
provide the texture. In another method there may be
25 provided a base layer of fibre on which the woodchips are
spread without inclusion of fibre in this second layer.

Problems of stripping woodchip wallpaper are particularly
severe as the paper is conventionally overcoated after
30 application to the wall with one or more layers of paint
which form a moisture-proof barrier so water stripping is
ineffective and even steam stripping is difficult.
Because the outer ply is generally not strong and the
woodchips act as fracture points, large areas of part of
35 the paper, e.g. of one or two plies, cannot be pulled off.

We have now found that peelable textured papers with a multiply structure may be made by the introduction, between two plies, of a parting agent.

5 According to the present invention there is provided a multiply wallpaper including an outer ply of paper and a further ply including particulate texturing material, and, between two plies of the paper, a parting agent enabling the paper to be dry split between the two plies on either
10 side of the parting agent.

The paper according to the invention may be made accordingly with two or more plies. With two plies, the particulate texturing material is incorporated into the
15 ply to be attached to the wall, and the other paper ply is separated therefrom by a parting agent, and constitutes the outer ply.

According to a further aspect of the invention, there is
20 provided a method of making a multiply of wallpaper, the method comprising forming a first wet web and a second wet web, the second wet web including particulate texturing material, applying a parting agent to one web, bringing the two webs together to form a laminate, and drying the
25 laminate to form the wallpaper.

A wallpaper according to the invention, has an outer ply which is separable from the base in the dry state. This is achieved by incorporating a parting agent to weaken the
30 lamination between the two plies, and which allows the outer ply to be peeled off the base substantially in one piece.

Wallpapers according to the invention may be made without
35 difficulty on papermaking machines having two or more systems for depositing a wet paper web e.g. a conventional

twin-wire machine.

Preferably the parting agent is introduced between the plies by applying it to one of them (preferably one not
5 containing particulate texturing material) and before bringing the two plies together and drying the assembly. A convenient way of introducing the parting agent is to spray it as an aqueous dispersion or emulsion on to the ply.

10 The particulate texturing material may be any material convenient for such use and is not only wood chips, wood flour or the like. Scrap materials such as granulated plastics materials may be used to provide textured
15 effects. The particulate material is incorporated into the paper ply e.g. by incorporating the particles into the stock from which that ply is made, either by incorporation into the original furnish or subsequently. Woodchips used may vary in size from 6mm ($\frac{1}{4}$ ") cubes to flour. The weight
20 of woodchips used will depend upon their size and the effect desired. Typically wallpapers may contain approximately 22% by weight woodchips.

The outer ply is preferably of paper of adequate substance
25 to enable it to be peeled away as a whole when the paper is parted. A preferred range of weight is $35-80\text{gm}^{-2}$ e.g. $45-70\text{gm}^{-2}$, most preferably approximately 50gm^{-2} . If the parting agent is adjacent the outer ply, the outer ply should not be too lightweight to avoid the risk of paint
30 penetration preventing the parting agent working, and should be strong enough to enable it to be peeled off the base ply. Paper having a weight above 80gm^{-2} will generally be too expensive and below 30gm^{-2} too weak.

35 The base ply must be thick enough and/or sized to prevent the adhesive penetrating to the parting agent, and may in

conventional manner comprise a single layer, containing fibre and texturing material or a double layer comprising a base layer of fibre (without woodchips) and thereover a layer of woodchips and additional fibre.

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As a parting agent, clay is particularly advantageous as it has shear properties enabling the two plies to be separated. However, other materials can be used, for example, chalk, talc, barium sulphate and wax. However the use of wax may result in an accumulation of wax in the paper which can be undesirable. It is preferred that these agents be sprayed on to one of the plies, preferably the outer ply, prior to lamination in the form of a water-based emulsion or suspension.

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A preferred parting agent is clay, particularly China clay, which is sprayed on the ply in the form of a slurry. This slurry may be a cheap, general purpose slurry dispersed in water with a dispersing agent. The particle size needs to be such that the clay is not soaked right into the paper of the ply, but remains substantially at the surface of the ply in the final paper. An average particle size of the order of 2 to 10 micrometres is generally suitable.

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The amount of clay applied as a parting agent depends on the specification of the final wallpaper, and may be varied to secure an appropriate balance of cost and effectiveness. The amount of clay which will have an effect lies in the range of $1-15\text{gm}^{-2}$. If too little clay is used, the plies will not separate, and if too much clay is used, the plies may separate too readily e.g. as paint is applied to the outer surface of the wallpaper. The preferred range of clay is $5-8\text{gm}^{-2}$ and more preferably 6gm^{-2} .

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A twin-wire machine is convenient for manufacturing wallpaper according to the invention. The parting agent, for example clay, is applied as a 5-20%, preferably approximately 8%, weight by weight dispersion or emulsion to the outer ply after the "wet line" and after the moisture content of the wet paper has been reduced to between 70% and 80%.

As woodchip wallpapers are usually made using waste paper, the weights of the plies and the clay depends on the quality of the paper used. This may vary substantially and some of the paper used may already include a percentage of clay. However this varying amount will not generally affect the amount of clay applied as parting agent.

The base layer or ply (depending on whether it is a single layer or a twin layer) will normally be sized to stop the adhesive penetrating the ply. Of course, the outer ply may also be sized. Wet strength agents may be added to one or more of the plies to improve the wet handling properties of the wallpaper during application to a wall.

The total weight of the final wallpaper is at least 100gm^{-2} and is preferably in the range of $130\text{-}140\text{gm}^{-2}$.

Other standard papermaking techniques may if desired be employed when making the multiply paper of the invention. For example, the rear surface of the paper may be made flatter than it would otherwise be by machine glazing.

Wallpapers according to the invention may be used as such and adhered to wall surfaces using conventional water-removable adhesives. When it is desired to strip the paper, the outer ply is simply pulled away (optionally with one or more other plies depending on the construction

of the paper and the position of the parting agent) to leave the remaining ply or plies on the wall from which they can be very easily stripped simply using water to soften the adhesive behind the paper.

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If desired, the multiply paper may serve as a paper base for further treatment to produce a final wallpaper. For example, a textured blown vinyl wallpaper may be produced by overprinting the outer ply and forming a blown vinyl relief design on it in known fashion. Alternatively, textile materials, woven, laid or otherwise oriented can be adhered to the base multiply paper of the invention e.g. by adhesion or adhesive lamination.

15 The following Examples will serve to illustrate the invention:

EXAMPLE 1

20 A woodchip wallpaper was made using a twin-wire MG machine. On the lower wire, a base fibre layer (containing no woodchips) was formed. This layer had a dry weight between 15 and 30 gm⁻². After the base layer had been partially drained and water removed, a fibre and woodchip pulp layer was laid on top; this layer having a dry weight in the range of 40-70gm⁻². On the upper wire, an outer fibre sheet having a dry weight of approximately 50gm⁻² was drained and water removed.

30 A China clay suspension (Grade B slurry ex ECC International Limited, diluted to 8% by weight solids) was sprayed on to the upper surface of the sheet on the upper wire at a point past the wet point of the sheet (moisture content about 70 to 80% by weight). The China clay was applied at a rate adjusted to give a weight of 5-10gm⁻² in the final paper. This sheet was then passed over a roller

to lie with its clay bearing surface against the ply formed on the lower wire. The two plies were then further dried and laminated together, with the clay between them to form the final paper.

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The final paper contained approximately 22% by weight woodchips, and could be handled, hung and painted in the usual way. When it was wished to strip the paper, the outer ply could be easily peeled away at the clay layer, leaving a water-removable layer.

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EXAMPLE 2

A woodchip wallpaper was made using a twin-wire MG machine.

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The top sheet was prepared on the upper wire and a clay suspension applied as in the previous Example.

20 On the lower wire, a base sheet was formed from a single layer of fibre woodchips and having a dry weight of approximately 90gm^{-2} .

As before, the two plies were brought together with the clay bearing surface of the top sheet in contact with the base sheet and laminated to form the final paper which could be handled as described in the previous Example.

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EXAMPLE 3

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Using a twin-wire MG machine, two paper plies were produced, brought together wet, and the laminate dried to produce the final paper. Just prior to lamination, the underside of the upper web of the two being laminated was sprayed with a clay suspension of a standard papermaking clay (Grade B slurry ex ECC International Limited, diluted

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to 20% by weight solids) at a rate adjusted to give a weight of $10-15\text{gm}^{-2}$ in the final dried paper. The furnish for the upper web was a waste paper furnish and the machine was adjusted to produce an upper ply of weight
5 (dry) 70gm^{-2} . The lower web was a waste paper furnish containing approximately 22% by weight woodchips (based on the weight of the final paper). The finished paper could be handled, hung and painted in the usual way. When it
10 was wished to strip the paper, the outer ply could be easily peeled off in large sections, leaving a single ply on the wall easily removed using water. This paper having a higher weight of clay than the paper of Examples 1 and 2 was more readily peeled off but would require greater care in hanging and painting to ensure that it did not peel
15 inadvertently.

CLAIMS

1. A multiply wallpaper including an outer ply of paper and a further ply including particulate texturing material, and, between two plies of the paper, a parting agent enabling the paper to be dry split between the two plies on either side of the parting agent.
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2. A wallpaper according to Claim 1, wherein the parting agent is a material comprising at least one of chalk, talc, wax or clay.
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3. A woodchip wallpaper comprising a plain paper outer ply and a base paper ply containing woodchips as texturing material and substantially at the interface between the two plies a layer of clay as parting agent, the wallpaper having a weight of 130 to 140gm⁻² with an outer ply weight of 45 to 70gm⁻² and a clay layer weight of 5 to 10 gm⁻².
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4. A method of making a multiply wallpaper, the method comprising forming a first wet web and a second wet web, the second wet web including particulate texturing material, applying a parting agent to one web, bringing the two webs together to form a laminate, and drying the laminate to form the wallpaper.
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5. A method according to Claim 4, wherein the parting agent is applied to the first wet web.
6. A method according to Claim 4, wherein an aqueous suspension or emulsion of the parting agent is sprayed on to the first wet web.
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7. A method according to Claim 6, wherein the parting agent is chalk, talc, wax or clay.
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8. A method of making a woodchip wallpaper which method comprises forming a first wet web on an upper wire of a twin-wire paper making machine and a second wet web including woodchips as texturing material on the lower
5 wire of the twin-wire paper making machine, spraying the upper surface of the first wet web on the upper wire with a clay slurry, and then bringing the two webs together with the clay bearing surface of the first web in contact with the second web and drying the laminate so obtained to
10 form the wallpaper.

9. A multiply wallpaper substantially as hereinbefore described in the Examples.